FIRRE to Address IED Threat in Theater

The Family of Integrated Rapid Response Equipment (FIRRE) program is a multi-phase integration and development effort aimed at fielding advanced unmanned force protection systems to forward-deployed forces. The intent is to lower manpower requirements, enhance force protection capabilities, and reduce casualties, while keeping our warfighters out of harm's way. Potential force protection missions include casualty recovery, persistent perimeter security, and ex-plosives-ordnance/chemical/biological/radiological detection.

COL Camille Nichols (c), PM-Guardian, and Jon Moneyhun (l), PM-FPS representative, discuss FIRRE force-protection extensions of current MDARS capabilities with Bart Everett, SSC San Diego.

The FIRRE concept was developed by Northrop Grumman in conjunction with the OSD Joint Robotics Program (JRP). The JRP appointed the Product Manager, Force Protection Systems (PM-FPS) to develop and lead an IPT to determine the FIRRE way ahead.

The IPT includes representatives from the JRP, PM-FPS, Product Manager, Robotic and Unmanned Sensors (PM-RUS), US Army Military Police School (USAMPS), SPAWAR Systems Center (SSC), San Diego, Northrop Grumman/Remotec, Naval Explosive Ordnance Disposal Technology Division (NAVEODTECHDIV), Naval Surface Warfare Center (NSWC), Air Force Research Laboratory (AFRL), Army Tank-Automotive and Armaments Command Research, Development, and Engineering Center (TARDEC), Army Aviation and Missile Research, Development, and Engineering Center (AMRDEC), and the Robotic Systems Joint Project Office (RS JPO).

Jerry Edwards (c) of PM-FPS discusses FIRRE out-year plans and schedules with Bart Everett (l) and Robin Laird (r), FIRRE Technical Director for PM-FPS.

The FIRRE IPT has established a near-term integration effort to address an existing Operational Needs Statement for fixed-perimeter force protection at captured

A Real-time Unattended Weapon System

SSC San Diego recently demonstrated the Networked Remotely Operated Weapon System (NROWS) to NAVEODTECHDIV, the Physical Security Equipment Action Group (PSEAG), and the FIRRE Technical IPT.

Bart Everett (l) briefs NROWS capabilities to PSEAG members.

Sponsored by the Defense Threat Reduction Agency (DTRA), the NROWS project goal is to develop a resource that provides field or base commanders with a real-time unattended weapons pod that quickly extends their delay/denial response capabilities at high-value installations.

NROWS can be integrated with autonomous surveillance, detection, and assessment capabilities, and provides automated target tracking to facilitate timely response to enemy activity. A standardized weapon mount has been developed to enable rapid installation onboard unmanned ground vehicles, as well as various configurations of fixed (i.e., non-mobile) installations.

The initial application for NROWS is to provide a very close-in response to hostile

intruders in a fixed indoor installation, such as weapon storage bunkers. The system can also be mounted on unmanned ground vehicles to extend their mission capabilities in an outdoor environment, such as protection of missile launch facilities.

Major system components include a custom aiming platform manufactured by TeleRobotics Corporation (TRC), Sausalito, CA, and a command, control, and communications (C3) system developed by SSC San Diego. The C3 system incorporates sensor-assisted automatic target prosecution as designated by the human operator, using vision-based predictive motion tracking previously developed by the Unmanned Systems Branch.

Larry Drymon adjusts the NROWS unit, while Bart Everett (l) speaks with former Congressman Bill Lowery (c), and Metal Storm's Russ Zink.

The aiming platform has been fitted with an Airsoft replica of the M4 carbine to allow system development without the hazards of handling live ammunition.

NROWS utilizes a distributed transmission control protocol/internet-protocol

ammunitions sites. The long-term goal is a fully integrated layered force protection system of systems that employs a variety of fixed and mobile supporting technologies.

The Northrup Grumman/ Remotec TAGS vehicle demonstrates its aggressive mobility characteristics.

In November 2004, SSC San Diego, as the Technical Manager for FIRRE, hosted a demonstration of the near-term concept, which included an integration of the AN/PPS-5 ground surveillance radar, the Battlefield Anti-Intrusion System (BAIS) unattended ground sensor suite, and the Remotec Tactical Amphibious Ground Surveillance (TAGS) vehicle, all operating under the control of the Navy's Multiple Resource Host Architecture (MRHA). The MRHA is capable of simultaneously dispatching and supervising the operation of numerous unmanned systems and unat-

Remotec's Tim Cable (l) teleoperates the TAGS vehicle from the OCU as MAJ Bruce Archambault (USAMPS) looks on.

tended sensors from a single console. The demonstration was scripted as a perimeter-security-surveillance mission using unmanned systems/sensors to protect high-value assets within a bounded area of interest.

During the concept demonstration, two AN/PPS-5 radars furnished by PM-RUS were employed to provide long-range (>20 KM) intrusion detection of personnel and vehicles. Since the radars are primarily line-of-sight, three BAIS sensors were deployed to cover areas occluded from the radar field-of-view. The BAIS units included both acoustic and seismic sensors stationed along convenient avenues of approach. The MDARS-Exterior platform acted as a surrogate unmanned vehicle (the TAGS vehicle has not yet been fully integrated with the MRHA) performing perimeter security patrols.

The TAGS vehicle opened up for inspection after its mobility demonstration for FIRRE visitors.

An opposing force, consisting of three personnel and one light-duty truck, advanced along a route that intersected the field-of-view of the AN/PPS-5 and continued past the BAIS sensors. The radar successfully detected the vehicle while the BAIS confirmed the approach of the dismounted intruders. The MDARS platform was then dispatched by the MRHA to intercept the intruders and provide eyes-

on-target to assess and respond. The entire event was coordinated and controlled by a single operator interacting with the MRHA at a remote console.

Robin Laird (l), and Ted Kramer, Lead Software Engineer, with the AN/PPS-5.

The initial concept demonstration represented a successful integration, albeit only partially complete, of the FIRRE near-term technologies that will be fielded within the next 12-16 months. The demonstration showed the effectiveness of an integrated, layered force-protection system using only a limited assembly of unmanned system/sensor technologies. The possibilities for the long-term FIRRE solution are exciting given the emergence of a wide array of new technologies for detection, assessment, and response.♦

Titan's Lew Goldberg (c), MAJ Bruce Archambault and MAJ Eric Rannow (r) view UAV/UGV systems on static display during the FIRRE and PSEAG demos.

(TCP/IP) network communication architecture, which allows flexible integration and operation of numerous platforms from single or multiple control stations. Communications can be established via direct link or wirelessly, with anti-jamming and encryption incorporated.

The NROWS pan-and-tilt assembly can be mounted upon an unmanned vehicle to extend mission capability.

While the first generation of the NROWS will employ conventional weapons, future versions will likely incorporate Metal Storm pods, which are electronic-ballistic-technology weapons with no moving parts. These weapon pods are ideally suited to applications that require the system to be in place for long periods of time with minimal maintenance. Based on multiple-barrel stacked-round configurations, different caliber (as well as less-than-lethal ammunition) can be used against selected targets.♦